

RISK MANAGEMENT AND PROCUREMENT SYSTEMS – AN IMPERATIVE APPROACH

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Abstract

This paper discusses the link between risk management and the choice of procurement systems in the construction industry. Research has been done on the use of different procurement systems in construction but not enough emphasis has been placed on the link between risk management and the choice of the procurement system. One of the main objectives of any procurement system is to secure an optimum level of risk transfer between the client and the contractor. This is one of the reasons why alternative forms of procurement, for example, management contracting, design and build, build operate and transfer (BOT), design build finance operate (DBFO), prime contracting and hybrids of these procurement systems have been used in lieu of the traditional procurement model. The main aim of utilising these other procurement models is to transfer the risk to the party that is best able to deal with it. Some projects involve a higher level of risk than other projects. It is therefore imperative that the client chooses the procurement system that is best suited for the particular project after analysing the risks involved. The principal aim of this paper is to highlight the link between risk management and the client's choice of procurement system.

Keywords: procurement systems, risk, risk allocation, risk management.

Introduction

Risk and uncertainty occur in all construction projects. In construction projects, there are four parameters (objectives) within which risk should be addressed. These are scope, quality, cost and time. Increased integration between financial and real sectors of the economy, and major capital commitments in the building, means that the poor quality of risk management in construction has perhaps a greater significance at present than at any other time since the 1970s (Flanagan and Norman, 1993).

In the construction industry projects frequently run into problems and fail to meet the desired objectives. Risk management seeks to ensure that all goes according to plan and the project objectives are achieved. Several different types of procurement systems have evolved over the years from the traditional procurement model with the aim of facilitating the achievement of the project objectives. Studies have shown that these systems have different characteristics and are suitable to varying situations (Turner, 1990; Masterman, 1992). These procurement systems can be viewed as an important tool for risk management in the area of risk response development.

This paper reviews the relationship between risk management and the choice of procurement systems. It also utilizes a research project carried out in Botswana in 1992 and a follow-up study of five other Southern African Development Community (SADC) countries as the case studies. These case studies assist in emphasizing the

importance of utilising the correct procurement selection criteria and the implications on risk management if this is not done.

Definitions

Risk management

In this context, risk management is the processes involved in mitigating the possibility of unforeseen events adversely affecting the project objectives.

Procurement systems

Franks (1984) refers to construction procurement systems as *“the amalgam of activities undertaken by the client to obtain a building”*.

Love *et al* (1998) adopt the definition that a procurement system is *“an organizational system that assigns specific responsibilities and authorities to people and organizations, and defines the relationships of the various elements in the construction of a project”*.

In the context of this paper, the definition of procurement system advanced by Love *et al* (1998) was adopted.

Overview of the Risk Management Framework

The importance of proper risk management has received widespread endorsement in recent years (Flanagan and Norman, 1993; PMI, 1996; Raftery, 1994; Ross *et al*, 1996). The risk management framework as viewed by Flanagan and Norman (1993) is a useful platform from which the linkage between risk and procurement systems can be discussed.

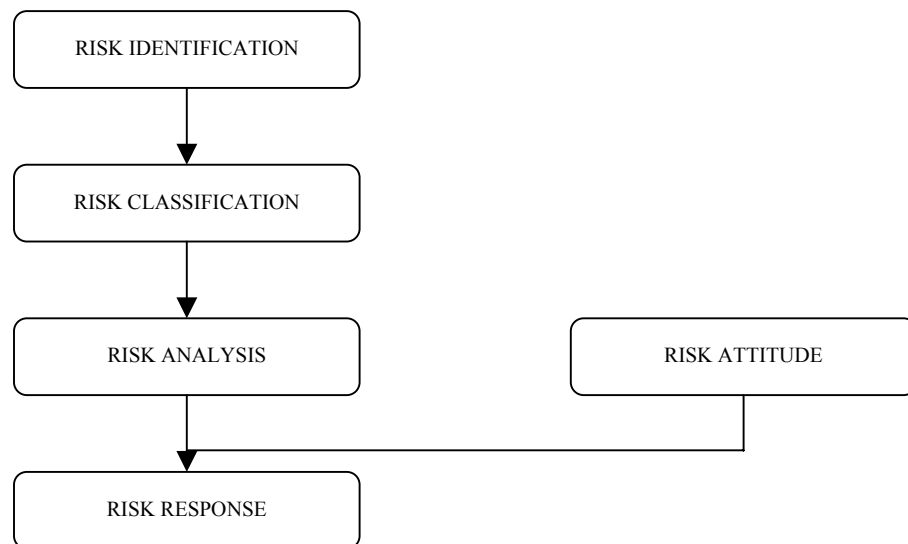


Fig. 1 The Risk Management Framework
Source: Flanagan and Norman (1993)

The relationship between risk and procurement systems lies within the area of risk response. It is however important to briefly discuss the other steps in the framework – risk identification, risk classification, risk analysis and risk attitude before embarking on a discussion of the link between risk response and procurement.

Risk identification

This is the first stage in risk management and it entails capturing all the potential risks that could arise within the project. To facilitate risk identification, risks can also be broadly categorized as controllable and uncontrollable risks (Flanagan and Norman, 1993). Further, controllable risks are those risks which a decision-maker undertakes voluntarily and whose outcome is, in part, within our direct control; and uncontrollable risks as those risks which we cannot influence.

Risk classification

Subsequent to risk identification, risks need to be classified in an appropriate manner. There have been a number of approaches suggested for classifying risks. Risks can be broadly classified as external and internal risks. Internal risks are those risks within the company or organization; and external risks are those factors that condition the environment in which an organization has to operate, and are outside the direct control of the firm (Chicken, 1996). The PMI (1992) suggests an approach reflecting a similar system and classifies project risk according to the primary source and relative controllability as:- external, unpredictable and uncontrollable; external, predictable and uncontrollable; internal non-technical but generally controllable; technical and generally controllable; and legal and generally controllable.

Risk analysis

After identification and classification, the risks need to be analysed and quantified. Various measurement techniques can be utilized to evaluate the risks and the range of possible effects. These techniques include mathematical approaches such as decision trees, expected monetary value, simulation or intuitive approaches such as expert judgement. The dangers of relying on the latter approach have been pointed out by several authors (Birnie and Yates, 1991; Flanagan and Norman, 1993; and Raftery, 1994) who have stressed the importance of using formal methods in risk analysis and decision making. Through risk analysis the decision maker can analyse the various risks which may adversely affect the project and make an informed decision on how to respond to these risks.

Risk attitude

Attitude can be viewed as a settled way of thinking. In terms of risk attitude, there is a suggestion that people/organisations can be grouped into three categories – risk loving, risk averse and risk neutral (Flanagan and Norman, 1993). Every project has a certain degree of risk hence the decision-maker should try and remain risk neutral in order to maximize the opportunities and minimize the threats presented.

Risk response and procurement systems

Risk response is the strategies used for responding to risk events. Flanagan and Norman (1993); Lowe and Whitworth (1996) argue that the response to or allocation of risk can be through:

1. Risk reduction;
2. Risk avoidance;
3. Risk transfer; and
4. Risk retention

Selection of appropriate procurement systems is one of the techniques for risk response. Unfortunately in most projects this technique is not utilized in an optimal manner. Turner (1990) states that the procurement route that is appropriate to the overall balance of objectives and to client priorities for each project should arise from those objectives and priorities. Latham (1994) has pointed out that in most cases once a client is satisfied about real need and feasibility within overall budgetary constraints, the instinctive reaction is to retain a consultant to

design the project – the “ring up an architect/engineer” syndrome. There are other important considerations to be made and the client should be fully aware of them.

Love *et al* (1998) report that NEDO (1985), Skitmore and Marsden (1988) and Singh (1990) suggest the following criteria to establish a profile of the client requirements and preferences for the procurement method:

1. speed (during design and construction);
2. certainty (price and the stipulated time and knowledge of how much the client has to pay at each period during the construction phase);
3. flexibility in accommodating design changes;
4. quality (contractors' reputation, aesthetics and confidence in design);
5. complexity (client may specify particular subcontractor, or constructability analysis);
6. risk allocation/avoidance;
7. responsibility (completion of program, price, product quality, design and construction);
8. price completion (covering such issues as value for money, maintenance costs and competitive tendering); and
9. disputes and arbitration.

The above criteria helps to emphasize that risk allocation is one of the issues to be considered by the client before choosing the procurement route. Unfortunately, in many instances there is incorrect choice of procurement system and this increases the probability of risk events occurring within the project. There are strong indications to suggest that the choice of procurement system is a decision that is often hastily made or not adequately considered adequately and as a result, the traditional system is used as a *default* system.

Lowe and Whitworth (1996) have argued that the allocation of risk is central to contract and procurement strategy. The amount of risk that each party will bear is largely attributed to the procurement strategy. This is illustrated below:

[illegible]

Fig. 2 Contract strategies and the balance of risk
Source: CUP (1993)

On one end of the spectrum, in design and build, most of the risk is borne by the contractor whereas on the other end of the spectrum, in construction management most of the risk will be borne by the client. In the traditional – lump sum fixed price system, the risk is evenly split between the contractor and the client. The client who wishes to accept little or no risk should take different routes for procuring advice from the client who places importance on detailed, hands-on control (Latham, 1994). Another procurement strategy is the recent proliferation of Private Finance Initiative (PFI) activities in the UK. It has been suggested that one of the main criteria for PFI projects is to allocate risk to whoever is best able to manage it with the aim of achieving optimum risk allocation (HM Treasury, 1995; Akintoye and Dick 1996).

A report by King (1996) indicates that in the US different procurement strategies are also being used as techniques for risk allocation and management, and control the likelihood of risk events such as time and cost overruns from occurring. King (1996) indicates that the data suggests that a design-build guaranteed maximum price (GMP) arrangement may not only meet the employer's cost concerns but his programme and quality worries as well. This is illustrated by a study in 1990 by the Hennepin County, Minnesota Regional Railroad Authority of three turnkey design-build projects, with respect to programme (schedule), cost control, and quality. King (1996) referring to Hoffman (1993) cites that the study "found that the turnkey projects were completed more quickly than traditional projects – 40 to 43 months versus 67 to 73 months after completion of preliminary engineering." Similarly, another study has suggested that when public agencies in the US have utilised design-build, "projects have come in 15 to 20 percent below the engineers estimate (Myers et al, 1995).

The SADC Case Studies

A review of a research project by Rwelamila (1999) based on a questionnaire survey carried out in 1992 in Botswana and a follow-up study in 1997 by Rwelamila *et al* (1999) in five other SADC countries namely, Tanzania, Malawi, Mauritius, Swaziland and Zambia assists in illustrating the link between the choice of procurement system and risk management.

In all these SADC countries, it is purported that the predominant procurement method is the traditional system. This system has certain characteristics that can be seen in Table 1. The research project aimed to find out if the use of the TCPS is through an informed decision or it is used by default. The respondents of the questionnaire survey in Botswana consisted of construction firm executives, site managers, trade managers and skilled operatives. A response rate of 50% was achieved. Telephonic interviews were conducted with senior technical officers of Public Works ministries in the other five SADC countries.

Table 1. Characteristics of the TCPS

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|----|--|
| A. | The client commissions and takes responsibility for the design of the works |
| B. | The design is complete at the time of selecting the contractor |
| C. | Prime cost sums, including nominated subcontractors do not form the major proportion of the contract sum |
| D. | The architect appointed by the client is adequately experienced to cope with the co-ordination of the design team, to lead the design effort and to co-ordinate the interface between design and fabrication |
| E. | The client uses the quantity surveyor to plan and control the finance of the project, in conjunction with the architect |
| F. | The client requires the contractor selection process to be based upon the contractor's estimate of price and for the contractor to bear the risk of the cost exceeding price |
| G. | The client reserves the right, via nomination, to select the subcontractors for certain parts of the work (but see C above) |
| H. | An acceptable negotiated project contract form is used in order to ensure a fair and familiar distribution of risk |
| I. | The client does not know what else to do, and the consultants do not raise the choice of procurement method as an issue |
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Source: Franks (1984) and Hughes (1992)

The respondents of the both the questionnaire survey and the interviews were requested to indicate whether their projects had the characteristics of the traditional construction procurement system advocated by Franks (1984) and Hughes (1992).

The tables below depict the respondents opinions based on the characteristics in Table 1.

Table 2. Opinions regarding the characteristics of projects (Botswana)

Project Characteristics	True	More true than false	Difficult to say	More false than true	False
A.	93%	-	6%	-	-
B.	-	-	5%	5%	90%
C.	88%	-	12%	-	-
D.	-	-	40%	5%	55%
E.	90%	-	10%	-	-
F.	85%	-	5%	-	-
G.	90%	-	10%	-	-
H.	-	-	-	20%	80%
I.	60%	-	20%	-	20%

Table 3. Opinions regarding the characteristics of projects (Tanzania, Malawi, Mauritius, Swaziland and Zambia)

Project Characteristics	True	More true than false	Difficult to say	More false than true	False
A.	100%	-	-	-	-
B.	15%	-	-	-	85%
C.	80%	5%	10%	-	-
D.	10%	-	-	-	90%
E.	100%	-	-	-	-
F.	100%	-	-	-	-
G.	85%	15%	-	-	-
H.	-	-	-	5%	95%
I.	90%	-	10%	-	20%

Major Findings

Several results emanated from the project. The respondents indicated that following characteristics of the TCPS applied to their projects (for both Tables 2 and 3):

- A. The client commissions and takes responsibility for the design of the works
- C. Prime cost sums, including nominated subcontractors do not form the major proportion of the contract sum
- E. The client uses the quantity surveyor to plan and control the finance of the project, in conjunction with the architect
- F. The client requires the contractor selection process to be based upon the contractor's estimate of price and for the contractor to bear the risk of the cost exceeding price
- G. The client reserves the right, via nomination, to select the subcontractors for certain parts of the work (but see C above)
- I. The client does not know what else to do, and the consultants do not raise the choice of procurement method as an issue

The respondents indicated that the following characteristics of TCPS *did not apply* to their projects (for both Tables 2 and 3):

- B. The design is complete at the time of selecting the contractor
- D. The architect appointed by the client is adequately experienced to cope with the coordination of the design team, to lead the design effort and to co-ordinate the interface between design and fabrication
- J. An acceptable negotiated project contract form is used in order to ensure a fair and familiar distribution of risk

Analysis of the major findings

- The respondents indicated that not all the characteristics of the TCPS applied to their projects. Only features A, C, E, F, G and I were applicable.
- According to the survey, the design is not normally complete at the time of selecting the contractor. This implies that the contractor gives a provisional price not a firm price for the project. Hence, one of the risks the client takes is that the costs may exceed the intended budget because the contractor did not have full information at the inception of the project.
- The survey also indicated that an acceptable negotiated project contract form is *not* used in order to ensure a fair and familiar distribution of risk. This strongly suggests that the risks are not allocated to the party that is best able to deal with them.
- The architect is viewed by majority of the respondents as not being adequately experienced to lead the project team. This implies that the project stakeholders are not confident that the architect can fulfil the leadership role competently, facilitate the process and enable the team to achieve the objectives.
- These results reveal that *they are not using* the typical traditional procurement system in Botswana, Tanzania, Malawi, Mauritius, Swaziland and Zambia. Contrary to what is purported, these countries are using the hybrid of the traditional building procurement system.
- Some of the issues arising such as the risks due to incomplete design could be solved through an alternative procurement system such as design and build whereby the contractor takes full responsibility for the design and construction of the facility. In this system the client will not have to be concerned about the risk of cost overruns or design risk due to incomplete or inadequate designs from the architect.
- The implications of these findings are that the project stakeholders do not select the method of procurement in an orderly and logical manner and this increases the likelihood of the occurrence of risk events in the project life cycle.

Conclusions

This paper has presented the link between risk management and procurement systems. The literature survey has revealed within the risk management framework that this link lies mainly within the area of the response to, or allocation of risk. This study illustrates how the procurement strategy chosen plays a major role in ensuring that the project requirements are achieved in terms of how much risk the client wishes to accept.

The SADC case study presented in the paper showed that the project stakeholders are inadvertently utilizing hybrids of the traditional procurement system. From the results of the study of these SADC countries it can be inferred that most of the English speaking countries in Africa have a similar procurement problem to that of these SADC countries. They have inherited the traditional procurement system from the UK and continued to apply it without considering the issue of selecting an appropriate procurement system.

The survey revealed a lack of consciousness of certain aspects such the link between risk management and procurement systems and various ways in which risk can be allocated through different procurement strategies. Hence the risks inherent in the projects are not being properly allocated to the party that is best able to deal with them in order to entirely or partly prevent them from occurring.

These factors strongly suggest that one of the causes of poor project performance in Africa is the use of inappropriate procurement systems resulting in critical problems such as poor allocation of risk between the client and the contractor.

Recommendations

The construction industries in Africa and other continents facing a similar problem need to improve their risk allocation methods and procurement strategies. It is recommended that awareness of the link between the different procurement methods and risk management should be increased. This could be done through the efficient dissemination of literature on various risk management and procurement approaches to the project stakeholders in these countries. Thereafter an appropriate methodology for procurement and risk can be developed.

A research project which commenced in November 1999 in the Department of Construction Economics and Management at the University of Cape Town under the management of the second author of this paper to develop the method of selecting appropriate procurement systems is a good start to addressing the problem.

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